

# Assignment 2: Coding Basics

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## OVERVIEW

This exercise accompanies the lessons in Environmental Data Analytics (ENV872L) on coding basics in R.

## Directions

1. Change “Student Name” on line 3 (above) with your name.
2. Use the lesson as a guide. It contains code that can be modified to complete the assignment.
3. Work through the steps, **creating code and output** that fulfill each instruction.
4. Be sure to **answer the questions** in this assignment document. Space for your answers is provided in this document and is indicated by the “>” character. If you need a second paragraph be sure to start the first line with “>”. You should notice that the answer is highlighted in green by RStudio.
5. When you have completed the assignment, **Knit** the text and code into a single PDF file. You will need to have the correct software installed to do this (see Software Installation Guide) Press the **Knit** button in the RStudio scripting panel. This will save the PDF output in your Assignments folder.
6. After Knitting, please submit the completed exercise (PDF file) to the dropbox in Sakai. Please add your last name into the file name (e.g., “Salk\_A02\_CodingBasics.pdf”) prior to submission.

The completed exercise is due on Thursday, 24 January, 2019 before class begins.

## Basics Day 1

1. Generate a sequence of numbers from one to 100, increasing by fours. Assign this sequence a name.
2. Compute the mean and median of this sequence.
3. Ask R to determine whether the mean is greater than the median.
4. Insert comments in your code to describe what you are doing.

*#Question 1*

```
Sequence1 <- seq(1,100,4) #Sequence from one to 100, increasing by fours
Sequence1 #Show sequence
```

```
## [1] 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89
## [24] 93 97
```

*#Question 2*

```
meanS1 <- mean(Sequence1); meanS1 #Name compute and show mean of Sequence1
```

```
## [1] 49
```

```
medianS1 <- median(Sequence1); medianS1 #Name compute and show median of Sequence1
```

```
## [1] 49
```

*#Question 3*

```
meanS1 > medianS1 #Ask if the mean of the sequence is greater than the median of the sequence
```

```
## [1] FALSE
```

## Basics Day 2

5. Create a series of vectors, each with four components, consisting of (a) names of students, (b) test scores out of a total 100 points, and (c) whether or not they have passed the test (TRUE or FALSE)

with a passing grade of 50.

6. Label each vector with a comment on what type of vector it is.
7. Combine each of the vectors into a data frame. Assign the data frame an informative name.
8. Label the columns of your data frame with informative titles.

```
# Question 5 and Question 6
vectorA <- c("Philip", "ELijah", "Louisa", "Lois") #Created a character vector
#Consists of four components (names)

vectorB <- c(86,92,42,96) #Created a numeric vector
#Four components (test scores out of 100 points)

vectorC <- c(TRUE,TRUE,FALSE,TRUE); #Created a logical vector with four components
#Says if students pass the test with a passing grade of 50.

#Question 7
ClassGrades <- data.frame(vectorA,vectorB,vectorC) #Created data frame

#Question 8
names(ClassGrades) <- c("Name","Grade","P/F"); View(ClassGrades); print(ClassGrades)
```

```
##      Name Grade  P/F
## 1 Philip    86  TRUE
## 2 ELijah    92  TRUE
## 3 Louisa    42 FALSE
## 4  Lois     96  TRUE
```

*#Labeled columns of data frame and displayed*

9. QUESTION: How is this data frame different from a matrix?

ANSWER: Data frames are more general than a matrix. Matrices contain elements of the same type whereas columns in dataframes can have different modes (i.e. numeric and factor). Data frames can combine multiple vectors.

10. Create a function with an if/else statement. Your function should determine whether a test score is a passing grade of 50 or above (TRUE or FALSE). You will need to choose either the `if` and `else` statements or the `ifelse` statement. The name of your function should be informative.
11. Apply your function to the vector with test scores that you created in number 5.

```
#Question 10
Passing <- function(x){
  ifelse(x>=50, "TRUE", "FALSE") #Used ifelse
  #See whether a test score is a passing grade of 50 or above
}

#Question 11
Q11Answer <- Passing(vectorB); Q11Answer #Applied vectorB (test scores) from Q5
```

```
## [1] "TRUE" "TRUE" "FALSE" "TRUE"
```

*#Showed answers*

12. QUESTION: Which option of `if` and `else` vs. `ifelse` worked? Why?

ANSWER: `ifelse` worked rather than `if` and `else`. Using `ifelse`, an answer was returned for every component in the vector. `If/else` does not work if the answer is longer than one or , in other

words, it does not work on multiple values.